ECON 173 - Intermediate Microeconomic Analysis
Drake University, Fall 2013
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EXAMINATION #2 ANSWER KEY

Version A

I. Short answer

(1)	a. less preferred.	b. less preferred.	c. more preferred.
	d. more preferred.	e. cannot be determined.	
(2)	a. inelastic.	b. decrease.	c. 3 %.
	d. increase.	e. 2 %.	
(3)	a. luxury or superior good.	b. increase.	c. 7 %.
	d. increase.	e. 2 %.	
(4)	a. -0.6	b. decrease.	c. 9 %.
	d. 3 %.	e. 6 %.	
(5)	a. $5.	b. 12 units	c. $20.
	d. 4 units.	e. -2 units.	f. -6 units.
(6)	a. L = 140.	b. P = 125.	c. $\sqrt{140 \times 125}$
(7)	a. worse off.	b. $24.	c. $32.

II. Problems

(1) a. -3/5. b. straight line with "sub sandwich" intercept at 12 and "other goods" intercept at 20.

(2) a. $100 = 2\, q_1 + 5\, q_2$. b. $MRSC = MU_2/MU_1 = 4\, q_1 / q_2$.
c. Tangency condition is MRSC = 5/2. Solve this equation jointly with budget equation from part (a) to get $q_1^*=10$ and $q_2^* = 16$.

(3) a. $MRSC = MU_2/MU_1 = 2\,(q_1+3) / q_2$.
b. Tangency condition is $MRSC = p_2 / p_1$. Solve this equation jointly with budget equation $I = p_1q_1 + p_2q_2$ to get $q_1^* = \frac{I}{3p_1} - 2$, and c. $q_2^* = \frac{2I}{3p_1} + \frac{2p_1}{p_2}$.

(4) a. Yes, homogeneous of degree zero because $\frac{aI}{5\,ap_1} + \frac{2\,ap_2}{ap_1} + 6 = \frac{I}{5\,p_1} + \frac{2\,p_2}{p_1} + 6 = q_1^*$.
b. Ordinary good because $\frac{\partial q_1^*}{\partial p_1} = -\left(\frac{I}{5} + 2p_2\right) p_1^{-2} < 0$.
c. Normal good because $\frac{\partial q_1^*}{\partial I} = \frac{1}{5p_1} > 0$.
d. Substitutes because $\frac{\partial q_1^*}{\partial p_2} = \frac{2}{p_1} > 0$.

III. Critical thinking

(1) The minimum amount of income that Amanda must have to attain a target level of utility of $\bar{U}$= 600 utils is the cost of a bundle that is (a) on her target indifference curve and (b) at a tangency point with a budget line. Since Amanda's utility function is given as $U= q_1\, q_2$, the equation for the target indifference curve is

$$\text{(a) } 600 = q_1q_2 \text{ .}$$

The general formula for the tangency condition is MRSC = p_2/p_1 . Since Amanda's utility function is given here as U= $q_1 q_2$, we have MRSC = $MU_2/MU_1 = q_1/q_2$. The price ratio is \$4/\$6. So the tangency condition is

(b) $q_1/q_2 = 4/6$.

Solving (a) and (b) jointly gives $q_1^* = 20$ and $q_2^* = 30$. This bundle will cost 20×\$6 + 30×\$4 = **<u>\$240</u>**, answer.

(2) Demand is given by $q_1^* = 27p_1^{\varepsilon}p_2^{\alpha}I^{\eta}$. Homogeneity of degree zero means that if income and prices are all multiplied by some factor (a) then that factor cancels out, leaving the original demand function. (In other words, quantity demanded is unaffected by perfectly balanced inflation.) So we check homogeneity:

$$q_1^* = 27(ap_1)^{\varepsilon}(ap_2)^{\alpha}(aI)^{\eta}$$
$$q_1^* = a^{\varepsilon}a^{\alpha}a^{\eta}\ 27p_1^{\varepsilon}p_2^{\alpha}I^{\eta}$$
$$q_1^* = a^{\varepsilon+\alpha+\eta}\ 27p_1^{\varepsilon}p_2^{\alpha}I^{\eta}$$

Now the factor (a) cancels out if and only if $a^{\varepsilon+\alpha+\eta} = 1$, which is true if and only if the exponent equals zero: $(\varepsilon + \alpha + \eta) = 0$, answer.

Version B

I. Short answer

(1)	a. more preferred.	b. more preferred.	c. cannot be determined.
	d. less preferred.	e. less preferred.	
(2)	a. elastic.	b. decrease.	c. 6 %.
	d. decrease.	e. 1 %.	
(3)	a. necessary good.	b. increase.	c. 4 %.
	d. decrease.	e. 1 %.	
(4)	a. -0.9	b. decrease.	c.11 %.
	d. 2 %.	e. 9 %.	
(5)	a. \$8.	b. 6 units	c. \$4.
	d. 11 units.	e. +2 units.	f. +2 units.
(6)	a. L = 120.	b. P = 110.	c. $\sqrt{120 \times 110}$
(7)	a. better off.	b. \$24.	c. \$22.

II. Problems

(1) a. -2. b. straight line with "sub sandwich" intercept at 20 and "other goods" intercept at 10.

(2) a. $100 = 4 q_1 + 5 q_2$. b. MRSC = $MU_2/MU_1 = (2q_1) / (3q_2)$.
c. Tangency condition is MRSC = 5/4. Solve this equation jointly with budget equation from part (a) to get $q_1^*=15$ and $q_2^* = 10$.

(3) a. MRSC = $MU_2/MU_1 = q_1 / [3(q_2 -4)]$.
b. Tangency condition is MRSC = p_2 / p_1 . Solve this equation jointly with budget equation $I = p_1q_1 + p_2q_2$ to get $q_1^* = \frac{3I}{4p_1} - \frac{3p_2}{p_1}$, and c. $q_2^* = \frac{I}{4p_2} + 3$.

(4) a. Yes, homogeneous of degree zero because $\frac{aI}{10\,ap_1} - \frac{5\,ap_2}{ap_1} + 2 = \frac{I}{10\,p_1} - \frac{5\,p_2}{p_1} + 2 = q_1^*$.

b. Ordinary good because $\frac{\partial q_1^*}{\partial p_1} = \left(-\frac{I}{10} + 5p_2\right) p_1^{-2} < 0$, provided $5p_2 < I$, or alternatively provided if $q_1 > 2$.

c. Normal good because $\frac{\partial q_1^*}{\partial I} = \frac{1}{10\, p_1} > 0$.

d. Complements because $\frac{\partial q_1^*}{\partial p_2} = \frac{-5}{p_1} < 0$.

III. Critical thinking

Same as Version A.

[end of answer key]